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5 Patent Claims

Carrier For Structural Parts And Method For Producing Same

- 10 1. A carrier (10, 38, 100) for structural parts to be
subjected to a heat-treatment process, comprising at least
one frame (11, 40, 102, 104, 106, 108, 110) and a lattice
(20, 50, 112, 114, 116, 118, 120) consisting of
15 intersecting strands proceeding therefrom, wherein the
frame comprises one or more limbs (12, 14, 16, 18, 42, 44,
46, 48, 121, 122, 124, 125, 126, 128, 130, 132, 134, 136,
138, 140) preferably forming a polygon, and wherein the
frame (11, 40, 102, 104, 106, 108, 100) comprises
20 temperature-resistant material and the strands of carbon
fibers or ceramic fibers which form the lattice (20, 50,
112, 114, 116, 118, 120) extending from the limb or
pieces (12, 14, 18, 42, 44, 46, 48, 121, 122, 124, 125,
126, 128, 130, 132, 134, 136, 138, 140) of the frame,
characterized in that
25 the lattice (20 50) is formed by a section of an endless
fiber bundle extending between limbs (12, 14, 16, 18, 42,
44, 46, 48) of the frame in the form of single-layer or
multilayer fiber strands or intertwined yarns of a carbon-
reinforced carbon material and/or ceramic material, the
30 fiber bundle extending in a warp and woof-like woven
structure between the limbs of the frame.
2. The carrier according to claim 1,
characterized in that
35 the limbs (12, 14, 16, 18, 42 44, 46, 48) of the frame
extend at a right angle to the plane formed by the lattice
(20, 50).

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3. The carrier according to claim 2,
characterized in that
the carrier (100) comprises several frames (102, 104, 106,
5 108, 100) forming a three-dimensional body and, in
particular, has a basket geometry.
4. The carrier according to at least claim 1,
characterized in that
10 the limbs (12, 14, 16, 18) have recesses in their
respective longitudinal edges, sections of the fiber
bundle passing through said recesses to mount the lattice
(20, 50).
- 15 5. The carrier according to claim 4,
characterized in that
the recesses form a ridge-like geometry in the respective
longitudinal edge (24, 26, 28, 30) of the limb (12, 14,
16, 18) of the frame.
- 20 6. The carrier according to at least claim 1,
characterized in that
the limbs (42, 44, 46, 48) of the frame (40) have openings
such as bores (52, 54) through which the fiber bundle
25 passes.
7. The carrier according to at least claim 1,
characterized in that
the fiber bundle laid in the woven structure extends under
30 prestress between the limbs (12, 14, 16, 18, 42, 44, 46,
48).

8. The carrier according to at least claim 1,
characterized in that
the frame (11, 52) is integrally cut out of a carbon
fiber-reinforced carbon plate.

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9. The carrier according to at least claim 1,
characterized in that
the limbs (42, 44, 46, 48) forming the frame (40) are
joined together by means of plug connections.

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10. The carrier according to at least claim 1,
characterized in that
the base of the frame (11, 38) or its limbs (12, 14, 16,
18, 42, 44, 46, 48) is a pyrolyzed fiber preform produced
by means of TFP technology.

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11. The carrier according to at least claim 1,
characterized in that
the frame (11, 40) comprises a section or sections
separated, in particular, by means of water jet cutting
from a carbon fiber-reinforced carbon plate, such as a CFC
plate.

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12. The carrier according to at least claim 1,
characterized in that
the fiber material comprises or contains Al_2O_3 and/or SiC
and/or BN and/or C.

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13. The carrier according to at least claim 1,
characterized in that
the lattice (20, 50) has a matrix which comprises or
contains carbon, B_4C , Al_2O_3 , SiC , Si_3N_4 and/or mullite.

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14. The carrier according to claim 13,
characterized in that
the matrix is separated from the gas phase and/or formed
5 by pyrolysis of a precursor material.

15. The carrier according to claim 14,
characterized in that
the precursor material is phenolic resin and/or furan
10 resin and/or a Si precursor.

16. The carrier according to at least claim 1,
characterized in that at least the lattice has or contains
a coating of oxides, nitrides and/or carbides of the third
15 and fourth main group and/or third to sixth subgroup of
the periodic system and/or carbon.

17. The carrier according to at least claim 1,
characterized in that the frame (11, 40) comprises carbon
20 fiber-reinforced carbon, fiber ceramic or graphite.

18. The carrier according to at least claim 1,
characterized in that
the carrier (100) has a parallelepiped geometry open on
25 one side with bottom and side frames (102, 104, 106, 108,
110) which are each holders for a lattice (112, 114, 116,
118, 120).

19. The carrier according to at least claim 18,
30 characterized in that
the upper limb (121, 122, 124, 125) of each side frame
(112, 114, 116, 118) is a flat element and/or the lower

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limb (126, 128, 130, 132) of each side frame is an angular element and/or limbs (134, 136, 138, 140) at a right angle thereto are each a round element.

5 20. The carrier according to at least claim 19,
characterized in that
the flat element forms, with its flat side, a plane in
which or in approximately which the lattice (112, 114,
116, 118) fixed by the frame (102, 104, 106, 108) extends.

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21. The carrier according to at least claim 19,
characterized in that
the respective flat element (121, 122, 124, 125) of the
side frame (112, 114, 116, 118) passes over in a flush
15 manner into the respective front end of a round element
(134, 136, 138, 140) on the outer longitudinal peripheral
side.

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22. The carrier according to at least claim 19,
20 characterized in that
adjoining flat elements of rectangular or approximately
rectangular abutting frames (102, 104, 106, 108) are
connected via a plug connection which, in turn, extends
within one of the round elements (134, 136, 138, 140).

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23. A method for producing a structural part consisting of
intersecting strands of carbon fibers or ceramic fibers
using a frame composed of one or more limbs, from which an
endless fiber bundle in the form of single-layer or
30 multilayer fiber strands or intertwined yarns are mounted
accordingly as the strands to form a desired lattice
structure, that a matrix is then inserted into the fibers

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and the lattice subsequently removed from the frame.

24. The method according to claim 23,
characterized in that

5 the lattice is separated, e.g. cut off, from its sections
extending from the frame.

25. The method according to claim 23,
characterized in that

10 the matrix is separated from the gas phase and/or formed
by pyrolysis of one or more precursor materials.

26. The method according to claim 23,

15 characterized in that the lattice is coated on the surface
prior to and/or after removal of the lattice from the
frame.

27. The method according to at least claim 23,
characterized in that

20 Al_2O_3 and/or SiC and/or BN and/or C is used as fibers or
fiber material.

28. The method according to at least claim 23,
characterized in that

25 carbon and/or B_4C and/or Al_2O_3 and/or SiC and/or Si_3N_4
and/or mullite is used as matrix material.

29. The method according to at least claim 26,
characterized in that

30 the lattice is surface-coated with oxides, nitrides and/or
carbides of the third and fourth main group and/or third
to sixth subgroup of the periodic system and/or carbon.

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30. A lattice or method for producing a lattice according to any one of the claims 1 to 39.